THE ORTHOPAEDICALLY HANDICAPPED AND COMPUTER USAGE: THE CASE OF TRNC

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ABSTRACT
Although various studies have been conducted in the field of orthopaedic impairment, research regarding computer education for orthopaedically impaired individuals remains insufficient. This study aimed to evaluate the use of computers by orthopaedically impaired individuals from a wider perspective. The findings of the study emphasise the importance of computer use by orthopaedically impaired individuals for enhanced improvement of their condition. In addition, the findings stress the need for training well-educated experts who can use technology effectively to enable adaptations for individuals who need special education in the European Union.
Keywords: Computer education, orthopaedically handicapped, special education, services for orthopaedically handicapped individuals.

INTRODUCTION

Individuals in the 21st century are expected to be open to technological developments and to communicate with their environment by using technology. Significant developments in this respect are taking place for individuals who need special education. Our country has been restructured socially, economically and legally and has been improved by accepting the norms of developed countries. These improvements and restructuring have significantly contributed to protecting the rights of the individuals who need special education.

Although various studies have been conducted in the field of orthopaedic impairment, research regarding the education of computer use by orthopaedically impaired individuals remains insufficient. This study aimed to evaluate the use of computers by orthopaedically impaired individuals from a wider perspective using a case study. The findings of the study emphasise the importance of computer use by orthopaedically impaired individuals for enhanced improvement of their condition. In addition, the findings stress the need for training well-educated experts who can use technology effectively to enable adaptations for individuals who need special education in the European Union.

Education is a systematic process that serves to improve the thoughts, attitudes, behaviours and lives of people in line with predetermined objectives (Barutçugil, 2002, p.18). The education system consists of schools established for the purpose of meeting the education needs of all individuals of the nation and realizing the educational objectives of the government (Başaran, 2000, p. 12). Institutions that educate individuals who need special education constitute an important part of this system.

Science and technology have important impacts on the lives of individuals and of society as a whole, and they change the structure and functions of social institutions. Parallel to these changes, change and improvement are also needed in education institutions (Yetim and Göktaş, 2000, p. 56).

Like other educational tools, computers are multi-faceted devices that provide unique benefits in the teaching experience (Yalın, 2002, p. 162). Various studies have been launched based on the opinion that computers should be used in education and, in particular, that teachers should be able to use computers effectively in the education training process (Erçelik, 2004, p. 2).

Computers are being used as both a means and an end in education. As technology advances, computers, which are used in every field of daily life, have a considerably important potential role in the field of education. Thus, the impact of computers is being researched, and efforts are being made to improve the facilities provided to children for computer usage (Sevinç, 1996, p.8).

Goldman and Pelligrino (1987, p.144-154) emphasised that computer technology has a considerably important potential role in improving educational experiences and facilitating the learning of handicapped children. They stated that such technological innovations provide a teaching environment that responds to the needs of handicapped children once the educator and computers complement each other. Various factors prevent the active participation of handicapped children in education. The most important of these factors is the difference in the comprehension levels of such children. Computers that establish one-on-one contact with children, thus providing a type of individual-based education, can ensure that every handicapped child actively participates in the education process. Handicapped children must receive an individualised education with the help of education materials and methods that best suit their situations and skills. Individual education is more important in special education because the differences in the levels of handicapped children are greater (Sevinç, 1996, p.12).

In special education, computers are used to improve the academic skills of handicapped children; in particular, they are used to enhance hand-eye coordination, small-muscle motor skills, imitation and language development and many similar developmental areas. Computer education programs aimed at general problem-solving skills such as mathematics and reading-writing skills are frequently used by educators of handicapped children. Many studies show that computerised education programs have positive impacts on the academic, language, mathematic and reading-writing skills of handicapped children; such programs improve the concentration period and learning performance (Sevinç, 1996, p.12).

The concept of "education technology" must be defined to ensure the effective use of information technologies. Education technology is the whole academic system that effectively designs teaching and learning environments, solves problems that occur during teaching and learning and improves the quality and permanence of the learning output. Thus, the basic purpose of education technologies is to effectively and permanently ensure learning (İşman, 2002).

Education technologies are essential in today's education system. Schools that do not employ education technologies cannot keep pace with the society, which is progressing with incredible speed and becoming technology-intense. Most of our schools still do not request education technologies. Some of our schools, on the other hand, have managed to effectively employ education technologies with the following benefits: rapid dissemination of knowledge, individual learning environments, permanent learning, project works and global education opportunity (İşman, 2001).

Although education technologies can provide the necessary facilities, the most important role is undertaken by teachers, who must be able to effectively use education technologies. However, teachers around the world do not use education technologies in teaching-learning environments (İşman, 2002). This is also the case in our country. Although education technologies can be found in schools within the Turkish education system, the funding for institutions, teachers and administrators of special education is not at the desired level.

For technology, especially in education using computers and computer-based systems, it is most important to determine how students can learn and use it effectively. The internet and its numerous functions can be used to gather and deliver information through easy navigation. Technology and the internet represent a new dimension in the perspective of education, especially in the student learning-teaching cycle (Forcier, 1996).

The internet is a part of educational technology. Educational technology is the process of visualising, simulating and solving educational problems by integrating software and hardware. Educational technology includes the computer and internet as hardware. It is a whole process that makes the learning environment constructive with new, creative educational activities for delivering information in an interactive way through the internet. Technology is a way of communicating with students and increasing their motivation. Educational technology has an internet-based side as well. Educational technology is a tool to increase the quality of learning through the integration of technology, content and learning strategies. In addition, implementation of educational technology and its main tool, the internet, requires that educators be more productive, willing to add new developments, creative during learning, willing to let individuals have their own learning with cooperative and shared intelligence, and ready to promote meaningful learning based on a constructivist approach (Maddux, et al., 1997).

This study aimed to examine the attitudes of orthopaedically disabled persons regarding the use of computers in Cyprus and to identify the attitudes of those who serve orthopaedically disabled persons, using different variables to characterise the environment in terms of the provided opportunities.

METHOD

In this study, a mixed model was applied because of the use of both quantitative and qualitative methods. The quantitative data consisted of the measurements of orthopaedically disabled persons' attitudes towards computers. The participants voluntarily involved in the research study included 175 male (N=100) and female (N=75) orthopaedically disabled individuals.

The Computer Attitude Scale-Marmara was developed by Deniz (1994) to measure attitudes towards computer use. The scale consists of three separate subscales: showing interest in computers (SIC: 12 items), computer anxiety (CA: 15 items) and the use of computers in education (UCE: 13 items). In addition, the combination of all the scales (42 items) can be used to determine the overall computer attitude. The concurrent validity (r=.63, p<.01) was computed with the Computer Attitude Scale (Aşkar, 1987). For the reliability of the instrument, the test-retest reliability and inter-scale reliability were computed. The test-retest reliability was .82, and the inter-scale reliability of the subscales was between .81- .92.

The BTO-M was prepared as a Likert-type attitude scale with five options. It was designed to determine the intensity of the attitudes by rating among the following options: "totally agree", "strongly agree", "agree", "disagree" and "totally disagree". Also, at the beginning of the scale, various questions relating to the personal information of the orthopaedically handicapped participants were asked.

The instruments used in the study were applied to orthopaedically disabled persons in a centre for the orthopaedically disabled and impaired. Each interview lasted for approximately ten minutes. The quantitative data were analysed with descriptive statistics and a MANOVA. For the qualitative analyses, two dimensions were used. In the first stage, in the 2009 spring semester, four people who serve orthopaedically disabled individuals in Cyprus were selected randomly. For the second stage, semi-structured questions were asked to 14 disabled people in order to support the findings of the attitudes towards computers. To analyse the qualitative data, a qualitative descriptive analysis was used.

RESULTS

The MANOVA statistical technique was applied to the data to determine the orthopaedically disabled individuals' attitudes towards computers (Table 1). Significant differences existed between male and female orthopaedically disabled individuals [Wilk's Lambda .869, F (3,168) = 6.34, p = .000, eta .131]. Also, significant differences were found between orthopaedically disabled individuals who use and do not use the internet [Wilk's Lambda .924, F (3,168) = 3.44, p = .010, eta .076]. The interaction between gender and internet usage produced significant differences in the orthopaedically disabled individuals' attitudes towards computers [Wilk's Lambda .897, F (3,168) = 4.84, p = .001, Eta = .103].

Table 1:*Orthopaedically Disabled Individuals' Attitudes towards Computers According to Their Gender and Internet Usage (MANOVA Results)*

	Wilk's λ	**F**	**p**	**Hypothesis SD**	**Error SD**	**Eta**
Gender	.869	6.34	.000	3	168	.131
Internet use	.924	3.44	.010	3	168	.076
Gender*Internet use	.897	4.84	.001	3	168	.103

The analyses revealed significant differences between the attitudes of male and female orthopaedically disabled individuals (Table 2).

Table 2: *F, P and Eta Square Values for Male and Female Orthopaedically Disabled Individuals' Attitudes towards Computers*

Subscales	**Gender**	**N**	$\overline{X}$	**Ss**	**SD**	**F**	**p**	**eta**
Interest towards computers	Female	75	44.40	9.07	3-175	8.980	.003	.050
	Male	100	45.30	9.31				
Computer Anxiety	Female	75	32.72	10.82	3-175	.015	.903	.000
	Male	100	39.11	9.63				
Educational Purposes	Female	75	39.32	6.80	3-175	19.148	.000	.001
	Male	100	43.25	8.67				
Total	Female	75	35.40	7.32	3-175	11.934	.001	.065
	Male	100	39.67	8.18				

As depicted in Table 2, significant differences were found in the interest towards computer subscale ($F_{(3,175)}$ = 8.980, p = .003), the educational purposes subscale ($F_{(3,175)}$ = 19.148, p = .001) and the total attitude score ($F_{(3,175)}$ = 11.934, p = .001). No significant differences were indicated for the orthopaedically disabled individuals' computer anxiety ($F_{(3,175)}$ = .15, p = .903) with respect to gender.

The results of the analyses revealed significant differences in the attitudes of orthopaedically disabled individuals according to their internet usage (Table 3).

Table 3.: *F, P and Eta Square Values of Orthopaedically Disabled Individuals' Attitudes towards Computers According to Internet Usage*

Subscales	Internet Use	N	$\overline{X}$	Ss	SD	F	p	eta
Interest towards computers	Yes	102	46.68	9.04	3-175	6.309	.013	.036
	No	73	42.45	8.88				
Computer Anxiety	Yes	102	38.00	10.69	3-175	8.345	.004	.047
	No	73	34.10	10.14				
Educational Purposes	Yes	102	42.31	8.89	3-175	1.984	.161	.011
	No	73	40.52	6.87				
Total	Yes	102	39.38	8.78	3-175	9.296	.000	.052
	No	73	35.69	6.46				

As shown in Table 3, significant differences were found in the interest towards computer subscale ($F_{(3,175)}$ = 6.309, p = .013), the computer anxiety subscale ($F_{(3,175)}$ = 8.345, p = .004) and the total attitude score ($F_{(3,175)}$ = 9.296, p = .000). No significant differences were indicated for orthopaedically disabled individuals' attitudes towards the use of computers for educational purposes ($F_{(3,175)}$ = 1.984, p = .161).

The analyses revealed significant differences in the attitudes of orthopaedically disabled individuals according to the interaction of gender and internet usage (Table 4).

Table 4: *F, P and Eta Square Values of Orthopaedically Disabled Individuals' Attitudes towards Computers According to Gender and Internet Usage*

Subscales	Gender	Internet Use	n	$\overline{X}$	Ss	SD	F	p	eta
Interest towards computers	Female	Yes	47	43.55	8.88				
		No	28	45.82	9.36	3-175	17.700	.000	.094
	Male	Yes	55	49.35	8.36				
		No	45	40.36	7.98				
Computer Anxiety	Female	Yes	47	34.55	10.52				
		No	28	29.64	10.80	3-175	.071	.790	.000
	Male	Yes	55	40.95	10.01				
		No	45	36.87	8.73				
Educational Purposes	Female	Yes	47	39.11	6.96				
		No	28	39.68	6.64	3-175	3.525	.062	.020
	Male	Yes	55	45.05	9.49				
		No	45	41.04	7.03				
Total	Female	Yes	47	35.64	7.61				
		No	28	35.0	6.92	3-175	6.257	.013	.035
	Male	Yes	55	42.58	8.49				
		No	45	36.11	6.20				

As shown in Table 4, significant differences were found in the interest towards computer subscale ($F_{(3,175)}$ = 17.700, p = .000) and the total attitude score ($F_{(3,175)}$ = 6.257, p = .013). No significant differences were indicated for the orthopaedically disabled individuals' attitudes towards the use of computers for educational purposes ($F_{(3,175)}$ = 0.071, p = .790). Also, no significant differences were found for the computer anxiety subscale ($F_{(3,175)}$ = 3.525, p = .062) based on the interaction of gender and internet usage.

In the qualitative analysis part of the study, semi-structured questions were asked to 14 orthopaedically disabled individuals. All of the participants agreed that computers were useful their lives. Their views related to the question "What are the uses of computer?" are indicated in Table 5.

Table 5: *Benefits of computers*

	F	**%**
Access to information	13	40.6
Communication	6	18.8
Economy of time	4	12.5
Education	3	9.4
Ease of reading and writing	2	6.3
Recreation	2	6.3
Shopping	1	3.1
Financial affairs	1	3.1
Total	**32**	**100**

Of the orthopaedically disabled individuals, 40.6% stated that "access to information" was the most important benefit of computers. Another 18.8% indicated communication, 12.5% indicated economy of time, 9.4% indicated educational facilities, 6.3% indicated the ease of reading-writing tasks and recreational activities and 3.2% indicated shopping and financial affairs as uses of computers.

Their views related to the question "How have computers change your life?" are indicated in Table 6.

Table 6: *Impressions of Orthopaedically Disabled Individuals about Computers*

	F	**%**
Ease of life	9	28.1
Recreational activity	6	18.8
Reduction in job turnaround time	5	15.6
Having various types of information	4	12.5
No impact/nothing changed	3	9.4
Included new groups/new friendships	3	9.4
New perspective on life	1	3.1
Educational opportunity	1	3.1
Total	**32**	**100**

Of the orthopaedically disabled individuals, 28.1% stated that computers brought "an ease to life", 18.8% stated that computers created an option for "recreation", 15.6% indicated that computers "reduced job turnaround", and 12.5% indicated that they had access to various types of information due to computers; in contrast, 9.4% believed that computers did not cause any change in their lives, while 9.4% "included new groups" and 3.1% had a new perspective about life and opportunities for education.

Orthopaedically disabled individuals' views related to the question "Are there any negative effects of computers? If yes, what are these negative effects?" are indicated in Table 7. Six of the fourteen (42.86%) participants believed that computers had negative effects, but eight (57.14%) did not believe that computers had negative effects. The latter group believed that people create negative effects because of the inappropriate usage of computers.

Table 7**:** *Negative Effects of Computers*

	f	**%**
Being asocial	8	47.1
Lack of physical activity	3	17.6
Physical disorders	3	17.6
Access to illegal websites on the internet	1	5.9
Access to incorrect information on the internet	1	5.9
Reduction in school success	1	5.9
Total	**17**	**100**

As stated in Table 7, 47.1% of orthopaedically disabled individuals believed that computers made them asocial because they spent all day in front of a computer. Another 17.6% believed that a lack of physical activity and physical disorders such as back pain, lumbago, neck pain and others were negative effects of computers. In

addition, 5.9% believed that accessing illegal websites and obtaining incorrect information from the internet were other negative effects of computers. Another 5.9% stated that computer usage caused a reduction in school success.

The opinions of an institution director, principal, psychologist and physiotherapist about the negative and positive implications of computers in their institution were queried. People who served orthopaedically disabled individuals stated that computers did have not negative effects. Perceived positive effects included the opportunity to perform searches and homework, the opportunity for social integration and the option for recreational activity.

DISCUSSION

Special education teachers and experts especially emphasise that computers motivate children to learn, affect their attitudes towards class activities in a positive manner, increase their concentration period and provide more frequent opportunities for practicing basic skills (Costen, 1987, p.8).

In this study, which was conducted to determine the attitudes of orthopaedically handicapped people towards technology, it was found that such individuals generally use computers and have an education-oriented attitude regarding technology. In addition, their technology-related attitudes varied significantly according to gender and the interest felt towards computers. Previous studies have addressed gender differences in ICT attitudes (Shapkaa & Ferrarib, 2003). While some studies found no gender differences in attitudes towards computers (Gressard & Loyd, 1986; Woodrow, 1992), other studies found that females manifested higher levels of anxiety related to computers than males (Sadik, 2005; Samak, 2006). According to North & Noyes (2002), the use of ICT tools is widely perceived as a masculine activity, which suggests a link between gender and technophobia (cited in, Samak, 2006). Female teachers have been found to be more anxious and less confident computer users in most studies. In addition, male teachers have been found to have more prior experience with computers and to be much more likely to implement computer use in their classrooms than female teachers.

For the question “Do you use the internet to find the information that you need?” the answers varied significantly according to the interest in computers and the degree of computer anxiety. The answers to the question “Do you use the internet to find the information that you need” depended on gender and also the interest in computers. Orthopaedically handicapped people stated that they used computers to obtain information and for the comfort provided in their lives, but that computer usage also made people more asocial. This study, which was conducted to determine the attitudes of institution employees towards technology, determined that orthopaedically handicapped people generally had a positive attitude towards technology.

CONCLUSION

Education technology and computer-assisted education courses must be added to the undergraduate programs of special education departments of universities that train teachers. A “coordination of computer-assisted education projects in special education” must be established within the Ministry of National Education in the Directorate General of Special Education, Guidance and Counselling. This coordinating group must organise in-service training activities for computer-assisted education programs that will be applied to special education institutions.

In special education institutions, computer-assisted education equipment must be prepared that fits the characteristics of every type of disability, and this equipment must be standardised.

Computer-assisted education software must be prepared that fits the disabilities, needs and curricula of individuals who need special education, and this software must be effectively promoted by the “coordination of computer-assisted education projects in special education” by special education employees. Funding must be provided by the Ministry of National Education so that special education institutions can obtain computer-assisted education equipment and software.

In the light of the research findings, the following can be recommended:

- the organisation of education programs related to technology within continuous education activities in the institution and incentives for employees to participate in these programs;
- the improvement of the technological equipment of government agencies, making computer laboratories more common and creating solutions to issues that prevent the institution’s employees and the handicapped from utilising such equipment;
- the inclusion of publications related to technology in the library of every institution;

- the motivation of handicapped people and institutional employees to utilise contemporary technological tools and devices (computers, projectors, etc.) in their education activities and to seek funding for it from the government;
- the founding of education technology centres within special education centres and the technical support and tools needed by the employees who work at these centres; and
- the repetition of similar studies with different sample groups and the implementation of their results.

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